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accuracy than the second, the transit of the first limb being the more difficult phenomenon to observe, and requiring care and practice for its accurate observation. The only account of a previous investigation of this nature that I know of is to be found in the *Proceedings of the Royal Irish Academy*, vol. vii. p. 371, where Dr. Robinson states that, from his observations made at Armagh in 1830, he found for the probable error of transit of Sun's first limb $\pm 0^{s}{\cdot}116$ and for that of second limb $\pm 0^{s}{\cdot}087$, whilst stars gave the result $\pm 0^{s}{\cdot}097$ (these observations, of course, were made by the "eye and ear" method); but I can discover no further details of this computation.

As an *addendum* to this paper, though not immediately connected with the subject of it, I may mention that I find that Argelander states (*Vierteljahrsschrift der Astron. Gesellschaft*, 1872, p. 16) that a transit over the first wire of a set is not as accurate as that over succeeding wires; and as I had the materials at hand, I thought I might as well test the statement in the case of the transits of the Sun observed at Greenwich. I have accordingly computed the probable errors of transits of the Sun's limb over wire i. and over wire ix. of the system of nine wires used for the observation of transits by the galvanic method, with the following result:—

	Probable Error of a Transit	
	over Wire i.	over Wire ix.
	s	s
⊙ 1 L.	± 0·075	± 0·073
⊙ 2 L.	± 0·071	± 0·070,

thus showing a slightly smaller probable error for wire ix.; but I know not whether it is decided enough to confirm Argelander's opinion, or ought to be considered as merely accidental.

On the Evidence of Periodic Variability of the Nebula H. II. 278, 1860·0, $\alpha = 2^{h}\ 23^{m}\ 25^{s}$, $\delta = -1^{\circ}\ 43'{\cdot}0$. By Prof. Winnecke.

Astronomers are unanimous, with regard to the variability of nebulæ, only about the variability of *one* Nebula, the very interesting object discovered by Mr. Hind, 1852, October 11, in $\alpha = 4^{h}\ 13^{m}\ 48^{s}$, $\delta = +19^{\circ}\ 11'{\cdot}2$ for 1860, which has been easily observed with the annular micrometer of a 4½-inch refractor by D'Arrest in the years 1855 and 1856. This Nebula has now completely vanished; it is not visible at present in our most powerful telescopes.

During the construction of the University Observatory at Strasburg, and in expectation of the 20-inch refractor* by Merz, mounted by Repsold, which is intended to be used for a thorough

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* Merz has finished two very good object-glasses of 20-inch free aperture; one of them has been purchased, after severe trial by myself, for Strasburg in September last.

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revision of the nebulæ, I commenced working, more than two years ago, in this field of research with an orbit-sweeper of 6½-inch aperture* (object-glass by Reinfelder and Hertel of Munich, mounting and micrometer by Repsold of Hamburg), and I have now micrometrical measures of more than 300 nebulæ, with the stars in their vicinity, generally on more than one night.

In comparing the former measures and descriptions with my own, strange differences are not seldom noticed; one of the most curious instances is presented by the Nebula H. II. 278 (1860·0, $\alpha = 2^{h}\ 23^{m}\ 25^{s}$, $\delta = -1^{\circ}\ 43'\cdot 0$). I find the following observations:—

H.	1875	Jan. 6	*p*B. S.E.; 1 obs.
h.	1827	Nov. 24	*p*B. S.E.; *b*M.
h.	1827	Dec. 20	*p*B. S.E.; *p*5*b*M.
R.	1856	(Nov. 29?)	Nothing particular.
D'Arrest	1856	Jan. 2	Nicht klein, doch sehr schwach. (Refractor by Merz, 4⅓-in. ap.)
Schönfeld	1861	Dec. 2	Ich habe, 1861, Dec. 2, bei Luft I mich nicht sicher von seiner Existenz überzeugen können, sondern nur notirt: *Vielleicht gesehen.* Die Sichtbarkeit ist allerdings vielleicht durch den Stern 75 *Ceti* ($5^{m}\cdot 6$), der nördlich folgt, etwas erschwert. (Refractor by Steinheil, 6½-in. ap.)
D'Arrest	1863	Nov. 3	Non egregie serenum. Subclara, minuta; manifesto haud "majuscula" ut in observatis meis Lipsiensibus annotatum reperio. Nucleum habet fixae 13^{m} haud dissimilem. Ipsa nebula oblonga, et quidem notabiliter. ✶ 13 ord. proxime seq. ad austrum.—Turbulenter omnia: densa nubes eripuit nebulam. (Refractor by Merz, 11½-in. ap.)
D'Arrest	1863	Nov. 7	Sudum conspicua, ellipsis satis stricta. Nucleum monstrat fixæ $11^{m}\cdot 12$ similem. 12 ord. seq. $5^{s}\cdot 75$ 2′ vel 3′ ad meridiem.
Schönfeld	1864	Feb. 2	Luft 1–2. Mässig schwach. Scheint nicht rund. 5*b*M. Kernlicht = $12^{m}\cdot 2$, aber nicht sternartig. 12^{m} seq. A dist. 2¼′. (Steinheil, 6½-in. ap.)
D'Arrest	1864	Nov. 6	Apprime serenum. Clara, longula; nucleus = ✶ 13 mag. ✶ 12^{m} mag. seq. $5^{s}\cdot 6$ nonnisi 1¾′ ad meridiem.
Vogel	1865	Nov. 13	Bei äusserst durchsichtiger Luft vergeblich gesucht, desgleichen Nov. 20. (Steinheil, 8½-in. ap.)
Schönfeld	1868	Jan. 16	Luft 2–3, 6″, rund, Kern fast sternartig $11^{m}\cdot 12$, 11^{m} seq. A dist. 3′.

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* For a notice on the beginning of these observations and a description of the orbit-sweeper and its micrometers, see *Vierteljahrsschrift der Astron. Gesellschaft*, Band x. pp. 297–305.

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Winnecke	1877	Jan. 6	Gut II Klasse, $1\frac{1}{2}'$ gross mit ... 1. Mit 170 facher Vergr. $30''$ l., $20''$ br., verlängert in $p = 7^\circ\cdot 2$.
Winnecke	1877	Jan. 10	Ein recht heller Nebel, II Klasse, $30''$ l., $20''$ br., zur Mitte stark, fast fixsternartig verdichtet.
Winnecke	1877	Sept. 14	Obgleich der Himmel sich wieder ziemlich stark mit Cirrus bezogen hat, sehr gut sichtbar, $1'$ lang, gedehnt in $p = 20^\circ$; scheint einen fixsternartigen Kern = $12^{m}\cdot 13$ zu haben.

The descriptions of the Nebula by the Herschels agree entirely; nor has Lord Rosse noticed anything particular. But in December 1861 the Nebula, which had been observed five years before by D'Arrest with a much smaller refractor, was *invisible* to Schönfeld with the splendid Mannheim refractor. In the years 1863 and 1864 it is observed both by Schönfeld and D'Arrest; 1865, November 13 and November 20, it is *again invisible* to the sharp eyes of Dr. Vogel with the Leipzig refractor. It may be noticed that an error in pointing the telescope on these days is impossible, for Dr. Vogel has observed other nebulæ near it on November 13 and 20. Schönfeld observed the Nebula again in the year 1868 without difficulty, and in the present year it is a *very easy* object for 6½-inch aperture.

It seems, therefore, probable that the quantity of light from this object reaching our eyes is very different in different years; a most important conclusion, as it is the first instance of a very great evidence for *periodic* variability of a Nebula.

Strasburg, 1877, *Dec.* 11.

On a Cause for the Appearance of Bright Lines in the Spectra of Irresolvable Star Clusters.

By E. J. Stone, M.A. Camb., Her Majesty's Astronomer, Cape of Good Hope.

In the Supplementary Number of the *Notices*, vol. xxxvii., there appears a short paper by Mr. Proctor "On the Arc of Light seen round *Venus* in transit." To this paper are appended some remarks which are, I presume, intended to be a criticism of my paper which appeared in the *Proceedings of the Royal Society*, No. 180, 1877. It appears to me, however, that Mr. Proctor has missed the point of my paper; and as I should prefer that my meaning be understood, I shall give Mr. Proctor's remarks and a statement of my views, extracted from the *Proceedings of the Royal Society*, for comparison with each other.

But before proceeding to this point I may perhaps be allowed to mention that Mr. Proctor's paper "On the Arc of Light seen round *Venus* in transit" is a particular case of the problem investigated by Sir G. B. Airy in the *Monthly Notices*, No. 1, vol. xxiv., 1863. Sir G. B. Airy proves that, if a part of the Sun's disk is viewed through a refracting medium which produces